changes have been made in the names of common species.——J. G. Baker continues his synopsis of Tillandsieæ in the November *Journal of Botany*, reaching No. 112, with the article to be continued. In the December number of the same journal Otto Nordstedt points out that a great many of the figures in Cooke's British Dermids are copied from Ralfs, Archer, Brébisson, De Bary and many other authors, in spite of the statement that "the greater part of the figures have been drawn direct from the specimens themselves." We must suppose that the artist imposed upon the author in this case.——G. Massee publishes in the December *Grevillea* a revision of Polysaccum, admitting eight species, of which two, *P. pisocarpium* and *P. turgidum* are American.

ENTOMOLOGY.[1]

THE HOP PLANT-LOUSE, *Phorodon humuli*.—An important contribution to our knowledge of the life of this species was made during the year just closed, by the Entomologist of the U. S. Department of Agriculture. Professor Riley, assisted by Mr. Pergande, Mr. Howard, and others, very carefully traced the transformations of the species throughout one complete cycle, *i.e.*, from the winter eggs of one year to those of the year following.

The most interesting result of these investigations is the confirmation in a striking manner of the previously known fact that this species passes the winter on plum trees.

It is urged by Professor Riley that this is the only mode of hibernation of the species, or at least that it does not winter on the hop. This is a point of the highest practical importance, and one which must be settled before a complete plan of defence from the ravages of this pest can be matured. Unfortunately, the evidence adduced by Miss Ormerod in her report for 1884, and indicating that one form of this species winters on the roots of hops, is too strong to be set aside by anything yet advanced.

The following is a résumé of the transformations of this insect, as determined by Professor Riley, and published in advance of his annual report[2]:—

"As soon as plum leaves put out in spring, the first generation of lice hatch from the winter eggs on plum. These are wingless agamic females, giving birth to young like themselves without the intervention of males. The third successive generation upon plum, however, is winged, not wingless, and the first fledged individuals

[1] This department is edited by Prof. J. H. Comstock, Cornell University, Ithaca, N. Y., to whom communications, books for notice, etc., should be sent.

[2] L. O. Howard, The Cultivator and Country Gentleman, November 17, 1887.

of this generation the present season were observed June 4. The individuals of this winged generation migrated at once to the hops, settled and began giving birth to the fourth generation, which consisted, as did the second, of wingless, agamic females. The fifth, sixth, seventh, eighth, ninth, tenth and eleventh generations followed, and were all composed, as was the first, of wingless agamic females, bringing observations in point of time down to the last week in August, or close to the commencement of hop-picking.

"The last week in August the offspring of the eleventh generation (themselves the twelfth) showed rudimentary wings, and at the same time the offspring born the previous week from the still living females of previous generations (as far back as the fifth) also showed plainly that they would become winged. August 26th the first winged females were observed at Cooperstown, and August 31st at Richfield Springs, the main locality for observations. September 2d they had already flown in small numbers to both Damson and wild plum, and had begun to deposit larvæ, which may be called the normal thirteenth generation. From day to day the winged lice increased in numbers until on the 13th of September the air was literally full of them, flying from the hop fields and settling on every variety of plum, and upon every available plum leaf. They were found a mile distant from any hop plant, searching for some plum tree on which to settle and bring forth young. Standing in front of a plum tree and facing toward a neighboring hop yard, Mr. Pergande observed a swarm coming from the hops and settling upon the plum. A most interesting point in this connection is the fact that none of these winged generations will settle and reproduce on hop. This was proven by careful and repeated experiment. So great were the number and so completely were the plums in certain places covered, that many of these winged females were obliged to settle upon neighboring weeds, where they brought forth young, which, however, died after feeding a few days.

"All of these winged individuals of the twelfth generation which migrated to plum up to September 28th were agamic females. (A few were still flying late in October.) Their young (thirteenth generation), however, attained full growth by this date, and proved to be all true sexual females, wingless. At this time the males were discovered. They proved to belong to the twelfth generation, but only to the very late and much retarded offspring of the retarded agamic wingless eleventh. They developed late in September upon the fragments of hop vines still remaining in the hop fields, and became winged the last week in September, just in time to fly to the plum and mate with the wingless sexual females which became full grown at this time or a little before. Immediately after this mating the eggs began to be deposited, and by October 7th large numbers could be found without trouble on the smaller twigs and branches of plum, in and around the angles formed by the buds and twigs. Each female laid from one to three eggs."

ON THE OCCURRENCE OF APTEROUS MALES AMONG THE APHIDIDÆ.—In view of the very few species of American Aphides in which apterous males have as yet been found, it may be of interest to call attention to the occurrence of this form in certain species whose autumn life history I have lately been studying. In *Schizoneura carnicola* this is the only male form produced, and it may be found abundantly during October on the leaves and twigs of various species of *Cornus*, often *in copulo* with the oviparous females. It also occurs in the root form of the corn-plant louse (*Aphis maidis*), having been taken with the oviparous females during October, in ant colonies, about corn roots; and in a species of *Aphis*, found abundantly in certain plants of *Amarantus albus*, during October. In all of these species the male is of the same general form, being slender and flattened, with long legs and antennæ, and very active in its movements.

The only reference to the occurrence of this form in America which has come to my notice is by Professor O. W. Oestlund, in his List of the Aphididæ of Minnesota,[1] in which he records finding it in several species of *Siphonophora*. I presume that when our species are more thoroughly studied it will be found to occur quite frequently. It is to be hoped that the recent progress made in our knowledge of the life-history of the group will stimulate a more thorough study of these much-neglected insects.—*Clarence M. Weed, Ill. St. Laboratory of Nat. History, Champaign.*

THE IMPORTED CABBAGE BUTTERFLY.—Mr. S. H. Scudder has collected a large amount of data regarding the introduction and spread of Pieris rapæ in North America. This he has very carefully digested and published as one of the Memoirs of the Boston Society of Natural History.[2] This memoir is accompanied by a map showing the centres and annual areas of distribution of the species in North America from its introduction in the East in 1860 to 1886.

The chief points brought out by Mr. Scudder's paper are the following:—

(1.) The insect was first captured in this country in 1860, by Mr. Wm. Couper, near Quebec. "From what we know of the rapidity with which a single pair may propagate, without hindrance from parasites, we may conclude with almost certainty that it was introduced in the early part of 1860, or, at the earliest, at the very close of 1859." This is a later date than is commonly assigned. (2.) In addition to the importation by way of Quebec, the species was introduced independently in New York in 1868, at Charleston in 1873, and at Apalachicola in 1874. These later introductions may have been by means of coasting vessels, or by rail from the North.

[1] Fourteenth Ann. Rept. St. Geol. of Minn., pp. 19–22.
[2] l. c., Vol. iv., No. iii.

(3.) The westward spread of the species was hastened by its spreading from colonies established at Indianapolis in 1874, and at Chicago in 1875. (4.) The species has reached the natural limit to its southern extension. This is shown by the fact that it can hardly maintain itself at Apalachicola and has not pushed its way into the peninsula of Florida beyond, hardly to, Jacksonville, although it has for ten years been within what would elsewhere be not more than a year's flight away.

ON THE SYSTEMATIC POSITION OF THE MALLOPHAGA.—Dr. Packard reviews[1] our knowledge of the structure of the Bird-lice, and compares them with the Pediculidæ and with the Psocidæ. He concludes that the Mallophaga are nearest allied to the Psocidæ, and are degraded members of the order to which the Psocidæ belong. He divides his order Platyptera into two sub-orders:—

I. Mallophaga.

II. Platyptera genuina: Superfamily 1, Plecoptera (Perlidæ); Superfamily 2, Corrodentia.

The Corrodentia as restricted by Packard above includes the Termitidæ, Embididæ, and Psocidæ.

ENTOMOLOGICAL NEWS.—Mr. S. H. Scudder published in the Canadian Entomologist for November "Comparative Tables for the Families of Butterflies." The characters of the families are given at great length, and include every stage of life. Bulletin No. 3 of the State Entomologist of Illinois is a Contribution to a Knowledge of the Life-History of the Hessian-fly, by S. A. Forbes. A list of the entomological writings of Dr. A. S. Packard, with a systematic and general index, prepared by Mr. Samuel Henshaw, forms Bulletin No. 16 of the division of Entomology of the U. S. Department of Agriculture; 339 titles are enumerated.

ZOOLOGY.

CONTRIBUTION TO THE FRESH-WATER RHIZOPODS.—During the last season some investigation was made for Rhizopods to illustrate this important group of animals before my pupils in Zoology.

Gatherings, from sphagnum swamps, the ooze of springs, ponds and sheltered coves along the Penobscot River near Orono, were examined.

By consulting Dr. Leidy's Rhizopods of North America the following species were determined.

[1] American Philosophical Society, September 2, 1887.